

REMARKS

Claims 13, 14, 18-33, and 35-37 are pending in the application. Applicants thank the Examiner for indicating that claims 31-33, and 35-37 are allowable (see page 11, paragraph 12 of the Office Action). Applicants bring to the attention of the Examiner that the present Office Action is non-final, but is listed in the U.S. Patent and Trademark Office Patent Application Information Retrieval system as a "Final Rejection."

The Claimed Invention

The present invention relates to a temperature-indicating element for a refrigeration device. In an exemplary embodiment as recited in claim 13, the temperature-indicating element may have a backing in the form of a circular aluminum disk 1 (see Page 4, line 29 - Page 5, line 1, and Figures 1 - 3). A thermochromic layer in the form of thermochromic pigmented film 2 is applied to the backing for indicating a predetermined desired temperature (Page 4, line 34 - Page 5, line 9, and Figures 1 and 2). The thermochromic layer is enclosed between the backing and a transparent protective layer in the form of a transparent casting compound 4 (Page 5, lines 11 - 17, and Figures 1 and 2).

The present invention makes it possible for a user to rapidly ascertain whether such sufficiently low temperatures are reached in a particular area of a refrigerator with a temperature display element, whereupon the temperature display element has a thermochromic pigment - i.e., a pigment that undergoes a reversible change in color as a

function of temperature - that is applied to a backing and the temperature display element can perform well in the constantly moist and cold environment of the refrigerator.

Another exemplary embodiment, as defined, for example, by independent claim 25, is directed to a refrigeration device including a temperature-indicating element such as recited by independent claim 13 discussed above.

The Rejections under 35 U.S.C. § 102

Claims 13, 14, and 19 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Suzuki et al. (U.S. Patent No 4,161,557). Applicants respectfully traverse this rejection.

The grounds of rejection argue that Suzuki et al. disclose a temperature-indicating element for a refrigeration device (citing col. 5, lines 22 - 24), comprising: a backing (14), a thermochromic layer applied to the backing for indicating a predetermined desired temperature (12 and 14) (see col. 4, lines 2 - 9), wherein the thermochromic layer is enclosed between the backing and a transparent protective layer (16).

Applicants maintain, as argued in prior responses that Suzuki et al. does not disclose or suggest the features of the temperature-indicating element for a refrigeration device as recited in claim 13 of the present application. In contrast to the temperature indicating element recited in claim 13, the Suzuki et al. reference disclose a complex structure for polyvinyl butyral-liquid crystal film forming compositions and films that change color according to the temperatures encountered. There, component liquid crystal compositions in the form of 2, 3 or 4 component liquid crystal compositions are employed for providing a desired color response, a mesophase or color-play temperature

range at a desired temperature level and having a suitable width of temperature range and/or desired glass transition temperature.

Preferably, the liquid crystals are selected to provide a color response in the mesophase range changing with increasing temperature from red through orange, yellow, green and blue to violet in the visible spectrum as the results of the light reflections are scattering by the liquid crystals (see col. 4, lines 2 - 9, of Suzuki et al). In contrast to the present invention, Suzuki et al. use liquid crystals and neither teaches nor discloses the desirability of using thermochromic pigments as recited in independent claim 13 of the present application. Also, Suzuki et al. does not provide an indication that a particular temperature level has been achieved but instead provides an arrangement in which different ranges are provided for indication of a temperature in a particular range.

Next, in the Suzuki et al. reference, compositions number 14 through 16 (from a table of compositions useful in Suzuki et al.), are useful for, among other purposes, providing leak detection in refrigeration. However, such leak detection does not provide the temperature indication inside the refrigeration device as provided by the present invention. Rather, Suzuki et al. is directed to a chemical formulation with no hint of use in a refrigeration setting but rather leak detection in refrigeration. The Suzuki et al. reference provides no hint that its chemical formation can be used for a generalized temperature indicator in a refrigeration device such as a household refrigerator.

Accordingly, Applicants respectfully submit that independent claim 13 distinguishes from Suzuki et al. Claims 14 and 19 of the present application depend ultimately from claim 13 of the present application and are allowable at least based on the

reasons set forth above and because these claims each recite additional patentable subject matter.

Claims 13 and 20 stand rejected under 35 U.S.C § 102(b) as being anticipated by Plimpton (U.S. Patent No. 4,738,549). Applicants respectfully traverse this rejection. The grounds of rejection allege that Plimpton discloses a temperature-indicating element, comprising: a backing (30); a thermo chromic layer (20a-k) applied to said backing for indicating a predetermined desired temperature; and said thermo chromic layer enclosed between said backing and a transparent protective layer (citing the upper portion of the casing material column 4, lines 51-54).

For claim 20, the grounds of rejection allege that Plimpton discloses a backing embedded in a backing element and covered by said transparent layer (citing col. 4, lines 47-56). Applicants respectfully submit that Plimpton discloses a thermometer 10 for immersion in a swimming pool (see col. 2, lines 63 - 65 and Figures 1 - 4). Plimpton discloses the use of liquid crystals to provide a temperature indication within a certain range, unlike the arrangement of the present invention that utilizes thermochromic pigments specifically chosen for the ability to change color at +4° C. Plimpton provides liquid crystal agents that are operable from about 150 F to about 1600 F (see col. 2, lines 18 - 20). The Plimpton device includes a liquid crystal display that indicates temperature over a desired range (see col. 3, line 7 - 10). Applicants respectfully submit that the Plimpton device does not provide an indication that a specific temperature has been achieved or is lower by using a visual perceptible symbol that is present when the

temperature is +4° C and absent when the temperature is lower than +4° C. Furthermore, the Plimpton device lacks all of the features recited in claim 13 of the present application. There is no backing such that the pool thermometer could be useful in a refrigerator. As noted, the present invention provides, in one aspect thereof, that an adhesive backing structure may be provided to permit placement of the thermometer wherever desired. However, according to Plimpton, a bore 45 through the casing 14 will allow attachment of a cord or the like so the thermometer may be hung from the side of a pool or hot tub to be drawn upward for temperature readings and then replaced into the water (see col. 4, lines 25 - 30). The Plimpton reference thus provides, at most, a teaching that a pool thermometer can be secured via a tether cord and a user can draw up the pool thermometer via the tether cord to observe a temperature reading. This is not a teaching that would lead one of skill in the art to provide a temperature indicating device in a refrigerator having the features as recited in claims 13 and 20 of the present application. Accordingly, Applicants respectfully submit that claims 13 and 20 distinguish from Plimpton.

The Rejections under 35 U.S.C. § 103

Claims 14 and 18-22 stand rejected under 35 U.S.C. §. 103(a) as being unpatentable over Plimpton. The grounds of rejection acknowledge that Plimpton does not teach the feature in claim 14, of a casting compound being a selected from one of a plastic room temperature curable material, a polyurethane material, and a vacuum treated material which is then cured. Further, the grounds of rejection acknowledge that

Plimpton does not teach the feature of claim 18 of a backing formed from an aluminum metal plate. Applicants respectfully submit that claims 14 and 18-22 of the present application depend ultimately from independent claim 13 of the present application and are allowable at least based on their dependency on claim 13 as well as each reciting additional patentable subject matter.

Claims 23 and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Plimpton in view of MacWilliams et al. (U.S. Patent No. 6,385,869). The grounds of rejection acknowledge that Plimpton does not teach the feature in claim 23 of a thermochromic layer provided with an orientation mark discernible at room temperature, and, in claim 24 of a film provided with a complementary mark complementary to said orientation mark of said thermo chromic layer. Rather, the grounds of rejection state that MacWilliams et al. disclose a label and method for applying wherein the label (700) includes alignment features (703 and 704) having corresponding features on the underlying member (citing col. 6, lines 26-45). As such, the grounds of rejection allege that it would have been obvious to one of ordinary skill in the art at the time of the invention to add an orientation mark and a complementary mark, as taught by MacWilliams et al., to the individual thermo chromic portions (20a-k) and the backing in order to assure correct orientation of the portions to the backing, as suggested by the teachings of MacWilliams et al. Applicants respectfully submit that claims 23 and 24 of the present application depend ultimately from independent claim 13 of the present application and are allowable at least based on their dependency on claim 13 as well as

each reciting additional patentable subject matter. The deficiencies of Plimpton are not overcome by the disclosure of MacWilliams et al.

Claims 25-28 stand rejected under 35 U.S.C §103(a) as being unpatentable over Plimpton in view of Hicken (GB 2,318,870). Applicants respectfully traverse this rejection. The grounds of rejection assert that it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have modified the device of Plimpton in view of Hicken to replace the liquid crystal with the thermochromic pigments of Hicken and to use a temperature of about 4 °C as suggested by Hicken. Applicants respectfully submit that neither Plimpton nor Hicken disclose or suggest the temperature-indicating element for a refrigeration device recited in claim 25 of the present application. As such, Applicants respectfully submit that any teaching, suggestion, or incentive possibly derived from the prior art to combine Plimpton and Hicken in the manner suggested in the grounds of rejection is only present with hindsight judgment in view of the instant application. As such, claim 25 is allowable. Moreover, claims 26 - 28 of the present application depend ultimately from independent claim 25 of the present application are allowable based on their dependency on claim 25 as well as for their own patentable features.

Claims 29 and 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Plimpton and Hicken as applied to claims 25-28 above, and further in view of MacWilliams et al. Applicants respectfully submit that claims 29 and 30 depend ultimately from claim 25 and are allowable for the reasons over Plimpton and Hicken

discussed above. The disclosure of Macwilliams et al. does not make up for the deficiencies of Plimpton and Hicken.

CONCLUSION

In view of the above, allowance of claims 13, 14, and 18-30 are respectfully requested. If the Examiner has any questions regarding this amendment, the Examiner is requested to contact the undersigned. If an extension of time for this paper is required, petition for extension is herewith made.

Respectfully submitted,

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